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The Experiences of Black Women Pursuing Advanced Degrees in STEM

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Black Women's Experiences in Pursuing Advanced Degrees in STEM

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Black Women's Experiences in Pursuing Advanced Degrees in STEM

Black women are severely underrepresented in science, technology, engineering, and math (STEM). In the private industry, a 2015 study revealed that Black women represented only 2% of scientists and engineers in science and engineering occupations yet they make up 12% of the U.S. workforce (National Science Foundation, 2017). However, this underrepresentation of Black women is not exclusive to the private industry. In academia, the presence of Black women in STEM is scarce as well. As of Fall 2019, out of approximately 50,000 Black people enrolled in graduate programs for the first time, 69.4% were Black women, which suggests there is a growing number of Black women who are interested in pursuing advanced degrees (Okahana et al, 2020). However, the number of Black women in STEM graduate programs remains small. Among first time enrollments in graduate programs, 18% of Black people were enrolled in public administration; 13% were enrolled in education and social and behavioral studies; yet *only 4.5%* of Black people were enrolled in physical sciences and *5.8%* were enrolled in engineering (Okahana et al, 2020). While the underrepresentation of professional Black women in STEM has been well-researched, the pipeline problem of the education of Black women in STEM has been overlooked in comparison. According to data from the IPEDS database, during the 2018 fiscal year, only 40 Black women obtained a master's degree in Computer Science compared to 128 Black men, 245 White women, and 1,350 White men (IPEDS, 2018). However, the number of Black women obtaining a Doctorate degree in the same field dramatically dropped to only 2 (IPEDS, 2018). Similar trends are seen in other STEM fields as well.

The lack of Black women graduate students in STEM is immensely problematic. Increasing the representation of Black women would increase diversity, which would

provide new and refreshing perspectives on pertinent problems and innovative solutions (e.g., Hofstra et al., 2020). Moreover, representation matters. Strong representation of Black women in STEM would increase the possibility of mentorship for future generations of Black girls and women looking to pursue STEM.

Currently, in postsecondary education, Black women experience structural challenges along with discrimination from peers and faculty. In fact, according to Golden's dissertation (2020) about Black women and their mental health and experiences in higher education, Black people-- and Black women, specifically-- encounter more occurrences of discrimination and racism than any other race and ethnicity in general. Studies have shown that Black women graduate students view their experiences differently than Black men and white graduate students (Bush et al., 2010). Black women were found to experience more feelings of isolation and less satisfaction with their graduate programs along with experiencing intellectual hindrance and devaluation from their peers and faculty (Bush et al., 2010).

The emergence of the COVID-19 global pandemic and national racial unrest and injustice has only exacerbated these challenges while simultaneously creating new, unforeseen ones for Black women graduate students. The COVID-19 pandemic has had global impact and has impacted millions of Americans. In the US, Black communities have been impacted disproportionately by the pandemic. Reports have revealed that Black Americans represented "one-third of all deaths from COVID-19 in the United States" yet only make up 13% of the population (McGee, 2020, p. 15). In some cities, Black people were "dying of COVID-19 at six times the rate" of white people (McGee, 2020, p. 15). Universities and colleges were heavily impacted by the

pandemic as well. In March 2020, U.S. campuses and classes pivoted to virtual learning and remote working spaces and many students' education was disrupted. Graduations were delayed along with the postponement of programs' starting dates.

There is a small, but growing literature on how the COVID-19 pandemic and racial injustice has impacted and affected gender and race; therefore, it is imperative that both be examined simultaneously. Although scholars are currently conducting research on how the pandemic is impacting faculty, the literature fails to adequately research how it is impacting graduate students. More research needs to be done because graduate students are an important group in the professional STEM pipeline. Many professionals were once graduate students and current graduate students are the future professionals of STEM. Furthermore, graduate students are not considered to be members of the faculty, but many teach undergraduate students and conduct research while simultaneously completing their coursework. Yet, graduate students lack the professional protection and job security of tenured faculty and often live on small stipends. Given the pandemic, these issues are amplified, because many graduate students struggle to obtain basic health insurance or coverage. This makes graduate students a more vulnerable and precarious group of people that are likely impacted differentially from faculty.

In summary, it is imperative to know how the pandemic has impacted Black women graduate students. In addition, current issues regarding racial injustice need to be assessed on how it is impacting Black women graduate students as well. Widespread Black Lives Matter (BLM) protests took place in the U.S. and some parts of the world over the summer of 2020 which were the products of perpetuated occurrences

of police brutality throughout the Black communities in the U.S. The organization of BLM and the protests are often met with polarizing, diametrically opposed debates, and opinion.

The purpose of this exploratory interview study is to identify the challenges that Black women graduate students in STEM fields are facing in their program studies while navigating life and school through a global pandemic and massive racial injustice and social unrest. Moreover, this study aims to identify how universities and faculty can better support Black women graduate students. This exploratory interview study may assist in helping universities better recruit and retain not only Black women but possibly other people from marginalized groups by learning how to create more diverse and safe spaces and offering the necessary resources to them. In addition, this study may offer succor for current and prospective Black women graduate students. It should offer valuable insight into the current environment and conditions in graduate programs while providing resources and possible coping mechanisms for dealing with the challenges Black women pursuing STEM degrees experience.

Literature Review

With the emergence of COVID-19 and the ensuing global pandemic, many aspects of normality have been interrupted, especially in education. These unprecedented times have made major adaptations to schools everywhere and pursuing education at all levels. For example, McLaughlin (2020) reported that Scottish graduate students feared the degrees they obtained would be stigmatized and deemed less qualified than degrees obtained pre-pandemic; this is due to the fact many colleges and universities are excluding certain admission requirements or making their

admission process easier due to these extenuating circumstances. In the U.S., there has been massive racial injustice and social unrest coupled with a global pandemic. There is a dearth of published scholarship on how Black graduate students, in general, have been impacted by current events and how they have coped while pursuing higher education that is riven by institutional/structural racism.

In higher education, Black graduate students, especially Black women graduate students, experience racism but it is not always overt racism; instead, the term that is used is 'colorblind racism' (Bonilla-Silva, 2017). Colorblind racism is the belief that we live in a post-racial society and erases the fact that race does exist (Carr, 1997). Consequently, this ideology creates the ideal conditions for microaggressive behaviors. A microaggression is defined as "brief, frequent, intentional or unintentional behaviors or environments communicating derogatory or inflammatory racial insults toward minorities" (Golden, 2020, p. 36). Microaggressive behaviors are directly related to feelings of hyper-visibility or, conversely, invisibility within Black people especially Black women (Golden, 2020; Sue, 2008). Additionally, prevalent microaggressive behaviors are related to Black people experiencing their degrees and achievements being challenged, lessened, and/or undermined as well as being placed in charge of race-based activities and assignments such as leading a program about diversity (Golden, 2020). Furthermore, Black students are often placed in charge of race-based activities and assignments, such as leading a program about diversity (Golden, 2020). Many of these experiences are exacerbated by the intersectionality of Black women's identities.

Theoretical Framework

Intersectionality is a concept that a person can face various forms of discrimination based on their race, gender, sexuality, religion, etc. This means that people's identities do not exist separately but rather are interdependent within broader, interlocking systems of oppression (Chandler, 2020). An intersectional approach is necessary to understand underrepresented and marginalized people who often experience multiple forms of discrimination and oppression (i.e., racism, sexism, homophobia, etc.) (Rankin et al, 2020).

The origins of intersectionality are rooted in Black feminism (Crenshaw, 1989); Black women could not relate to the white feminist movement due to their contrasting realities and felt that they were excluded by their white counterparts while also facing sexism within the Black community (Chandler, 2020). Intersectionality concurrently considers multiple aspects of someone's identities to understand the intricacies of prejudices one might face (Chandler, 2020). It allows for a multidimensional approach to understand how various social constructs (race, class, gender, etc.) affect self-perceptions, lived experiences, and how others perceive themself (Rankin, 2020). Leading intersectional scholarship puts an emphasis on the multiple oppressions people face and how they interact and occur simultaneously, and it centralizes context "taking into account the salience of both micro-level factors such as social identities and macro-level considerations" (Byrd et al., 2019).

Initially, the primary focus of this framework was to understand the lived experiences of Black women; however, it has grown to be used widely among various demographic and marginalized groups of people (Chandler, 2020). Intersectionality

allows for the acknowledgment that Black women experience race *and* gendered discrimination which, in turn, produces unique perspectives and interactions with their peers (Schwartz et al., 2003).

In higher education, intersectionality has a major impact on minority students, especially Black women (Byrd et al., 2019). Predominantly white universities and college campuses in the U.S. were designed originally to support white spaces so, even though all campuses have been legally desegregated and actively recruit students of color, these students often find themselves to be *in* the university but not *part* of it (Byrd et al., 2019). Black women specifically experience increased discrimination and stigmatization often by being faced with the increased expectations of service and the automatic assumption of incompetence (Byrd et al., 2019; Flores et al., 2020). These experiences can only be assumed to be intensified by the current conditions of the world, nationally and internationally. Black women faculty and students alike have been experiencing microaggressions and institutional racism for decades, yet relatively little research has been published that focuses on the experiences of Black women graduate students. Therefore, this study focuses on two research questions.

Research Questions

RQ 1: What challenges are Black women graduate students in STEM fields experiencing during the COVID-19 pandemic and amidst great racial injustice and unrest?

RQ 2: What can universities and faculty do to support Black women grad student STEM fields?

Method

Participants

The desired participants for this exploratory interview study are Black women graduate students who are currently pursuing an advanced degree in STEM at a college or university in the U.S. To qualify for this study, prospective participants needed to be least 18 years of age, and they needed to be pursuing an advanced degree in STEM and identify as a Black woman. Participants who completed the study received compensation in the form of a $25 Amazon e-gift card.

Procedure

The study entailed two parts 1) a short 5-minute online survey where the participants answered basic information regarding their academic history and other demographic information, and 2) a one-hour, one-on-one interview via a videoconference platform (e.g., Zoom, WebEx) or phone. See Appendix A for this study's consent form, research protocol, and recruitment materials. Using a semi-structured interview approach, the participants discussed their academic experiences before and after the pandemic. Listed below are a few sample interview questions that were asked:

1. When did you first become interested in STEM?
2. Why did you decide to pursue your graduate degree in STEM?
3. A lot has happened in the past year with the presence of COVID-19 and national racial injustice and social unrest all occurring at once. To what extent, if any, has

the global pandemic impacted your educational journey? To what extent, if any, has the national social unrest impacted your educational journey?

4. Overall, how can STEM graduate programs better support the success of Black women graduate students?

Positionality

My positionality for this project is based upon my own identity and future aspirations. I identify as a Black woman and have personally experienced microaggressive behaviors throughout my pursuance of obtaining a bachelor's degree in Biochemistry at a predominantly white institution that is a medium-sized public university in the midwestern region of the United States. My plans are to continue my education and attend graduate school to obtain a M.S. in Pharmacology and Toxicology. I am also planning to pursue a PhD in a similar field as my master's degree. So being a Black woman and a prospective graduate student, this project is of particular interest to me. Not only could it provide valuable insight to the environment and climate of graduate programs, but it would also reveal possible experiences and challenges I could possibly face in my future graduate program.

I am well-positioned to complete this project. Being a Black woman who has personally experienced microaggressions from both my peers and faculty will allow me to not only understand but to empathize with my participants. Furthermore, I am pursuing advanced degrees in STEM and am more familiar with the climate, lexicon, and culture in STEM fields. I understand the increased expectations and stress to work hard and being unwaveringly dedicated to your research and work. I understand how hard the course work can be and not having an adequate mentor to help you navigate

through the difficulties and challenges of being a Black woman who is pursuing a STEM education. My identity allows me to better understand the participants in the study as well as possibly making them feel more comfortable to speak freely and plainly.

However, while my experiences expertise uniquely positions me to complete this project, it can also come with limitations and biases. Since I can closely relate to my participants, I might have natural biases which can weaken my overall objectivity of the project. For example, my frame of reference is rooted in a U.S.-based perspective of race and gender, yet I interviewed Black women who identify as international graduate students. If this is the case, I am surrounded by trusted mentors who could offer outside insight and feedback. Not only that, but participants could divulge stories and information that I may find to be unsettling and upsetting due to having similar identities and experiences. If this issue should occur, it can be rectified by speaking with close confidants about my feelings and journaling. Overall, I bring more strengths and insights to this project than limitations and biases.

Analysis

During each interview, a printed set of interview questions was used to write down notes, thoughts, and key points. Once all interviews were conducted, the audio recordings were transcribed using a professional transcription site. The transcripts amounted to 71 pages and were each single-spaced. Any identifiable information was removed or altered to protect participants' confidentiality and adhere to IRB protocols. Identifiable information included replacing participants' names with pseudonyms, removing the names of colleges and universities, etc. Then the transcripts were read through multiple times to carefully become familiarized with the data.

A thematic analysis was used in analyzing the data. The data was dissected and analyzed by using a coding system. Coding data was approached with the guiding questions in mind: What challenges did my participants experience as Black women graduate students in STEM programs during the COVID-19 pandemic and racial injustice unrest? And what can universities and faculty do to better support Black women graduate students in STEM programs? After identifying overarching themes related to these two questions, a closer inspection of the data was done to identify subthemes (i.e., specific patterns in the types of challenges that participants experienced and the actions that universities and faculty can take). In the next section, I present this study's key findings.

Results and Discussion

The purpose of this study was to identify the challenges that Black women graduate students in STEM fields are facing in their program studies while navigating life and school through a global pandemic and massive racial injustice and social unrest. Additionally, this study aimed to identify how universities and faculty can better support Black women graduate students.

In this section, I present my study's key findings and discuss major implications, limitations, and directions for future research. Specifically, I begin by detailing the results. First, I identify the collective, institutional, and individual challenges that participants faced. Next, I examine themes about the impact of COVID-19 and national racial unrest. Finally, I share participants' advice and suggestions for the improvement of universities and their programs regarding diversity and inclusion along with support

for their graduate students who identify with marginalized groups. Limitations of the research and final thoughts will be discussed at the end.

Table 1 presents the participants' academic and demographic history. Pseudonyms were given to each participant to protect their identity. All participants were pursuing a graduate degree in STEM at a university in the United States. Four of the six participants identified as international students.

Table 1

Participants' Information

Participant's Name	Age	Race/ Ethnicity	Current Degree	1st Generation Student (Yes/No)	Financial Assistance (Yes/No)
Bebe	25	Black/Nigeria	M.S. Molecular Biology	No	Yes
Amaka	26	Black/Nigeria	M.S. Molecular Biology	Yes	Yes
Lois	30	Black/American	PhD Cancer & Cell Biology	Yes	Yes
Amagee	25	Black/Ghanaian	PhD Statistics	Yes	Yes
Etornam	23	Black/Ghanaian	M.S. Engineering Technology	No	Yes
Victoria	29	Black/American	PhD Biomedical Engineering	No	Yes

Note. Although this study was open to cis women and trans women, the final sample was composed of cis women participants.

Challenges Participants' Faced

Participants identified a wide collection of challenges they experienced as Black women graduate students in STEM. Thematic analyses revealed two overarching challenges: the importance of a good advisor and educational preparedness.

The Importance of a Good Advisor

Most participants had both good and bad experiences with their mentors and advisors, regardless of their race, rank, and gender. Understanding and empathy are very important in differentiating what makes a good or bad mentor or advisor. For example, Amagee said:

> She's an administrative staff. I could go to her office and just say whatever was on my mind that day. "Oh, I'm struggling with this emotionally, this and that." Sometimes, she gives very good advice. So, just having that community [and] sometimes you need a gadget. I remember at some point I needed an iPad, and I got an iPad from my department.

Having that trusted mentor to turn to truly made a difference. In the quote above, Amagee explained the benefits of having a mentor, specifically a Black woman mentor. She and other participants revealed that having a Black woman as a mentor made it easier to connect with them on a deeper level. Amaka, when speaking about her current mentor who is a white man, shared that "we don't have the same circumstances…The only thing we have in common is just the research--- the academics."

It is more than just assigning a mentor or an advisor, it is imperative that the assigned mentor understands their mentee's background and circumstances. However, some participants challenged the assumption that having a Black woman as a mentor

means having an automatic connection and positive experience. Victoria, for example, had the experience of having two Black women mentors in her academic history. For her first mentor, she felt a lot of pressure to be perfect and "the need to be excellent." The expectation of "Black excellence" put a lot of pressure on the student. Victoria detailed her feelings further by saying "while trying to live up to my best potential, I started feeling more self-doubt. It was a lot of pressure." With her second Black woman mentor, Victoria was able to be herself and let her guard down; she could be honest and know that her honesty would be met with understanding.

To reiterate, race and gender does not necessarily determine whether someone will be a great mentor or advisor. Lois explained how her current mentor, a white woman, made their relationship extremely toxic. She shared myriad examples exposing her advisor's problematic behavior, such as:

> It's just been extremely traumatizing, to be honest, like having somebody bombard you with emails. Like currently, I have her cell phone blocked, because I'm trying to get her out of communicating with me on my phone and emailing me instead. Like, if I don't email her back fast enough, she'll bombard me with text messages.

Lois's advisor has made an already toxic environment even more toxic for her. She shared that she has noticed, from speaking with friends, that white women and women of color who paint themselves as allies are actually the most toxic and abusive mentors.

Interestingly, Victoria revealed that having people in "higher positions who look like us" does not mean they will be an automatic connection. In other words, "all skinfolk ain't kinfolk." Although people share the same racial identity that does not necessarily

mean they share similar experiences. Intersectionality is more than race and gender, it includes class, sexuality, physical abilities etc. She has encountered Black people in higher positions who are "content with tokenism" which in turn leads to gatekeeping. They want to remain the only Black people in their department and unfortunately discourage students from pursuing job opportunities within their department, according to Victoria.

Educational Preparation

Some of the participants struggled overcoming an educational gap while in their programs. Two of the participants, Lois and Victoria, are HBCU alumni. Both women were proud to be HBCU alumni, but they felt they were not as educationally prepared as others in their competitive graduate programs. Lois said, "It's no secret that it does not completely, like some schools do, prepare you for these competitive programs." The lack of educational preparation led to them having symptoms of imposter syndrome. Victoria often had the thought of "why am I here?" and shared that her intelligence was often questioned by peers and even faculty. One professor degraded her by asking, "Don't you know calculus?" when she had trouble understanding a concept being taught.

Bebe, an international graduate student, was not as prepared for the shift in educational culture. She said, "In Nigeria, we use the British educational system so when getting my bachelors, we would only have one exam during the whole semester and there was little research involved." When participants felt educationally unprepared, they often had feelings of inadequacy and self-doubt which only worsened when their intelligence and skill set were questioned by peers and faculty in their programs.

The Impact of COVID-19 and National Racial Unrest

The emergence of the COVID-19 pandemic impacted virtually everyone. In the U.S., minority communities, especially Black communities, were disproportionally affected. While being majorly affected by COVID-19, major national racial unrest erupted due to multiple incidents of murderous police brutality against Black people. The protests that broke out across the country garnered attention and support internationally.

In this section, the 3 I's will be addressed: Interruption, Interaction, and Isolation regarding the impact of COVID-19. Secondly, reactions and the impact of national racial unrest will be discussed.

Untimely Interruption

Many of the participants faced uncertainty regarding their academic journey. Lois was on track to graduate in May of 2020, but she had to pause her research due to COVID restrictions keeping her out the lab for a month. She explained, "I'm finally graduating in April [of 2021], but I was supposed to graduate since last year. And that was extremely like, you know, like it really like messed with me mentally even more than this has already." She was not the only one who faced delays in their education. Etornam, a first-year international master's student from Ghana, had to postpone the start of her program. She was not able to begin her education due to COVID travel restrictions. All participants experienced uncertainty and challenges affiliated with the COVID-19 pandemic.

Lack of Interaction

"Before the pandemic I would meet people in class, and we do things together. But after the pandemic, no. Little to no interaction." ---Amaka

Before the pandemic Amaka had minimal interaction with her peers and with the emergence of COVID-19 interaction with her peers are virtually nonexistent. She said:

So, there are people who I've not seen in the whole year, even during the pandemic there are people I don't even meet in the corridor anymore. So, I feel like I have less…I used to have less interaction, right? But now, I have even less interaction within the department and with other people.

Lack of interaction affected many of the women. Bebe shared that she "hates online learning [because] it's so impersonal." Moving classes to online/remote has lessened the already minimal interaction the women had with peers and faculty. When discussing the shift from in person classes to online, Amagee revealed the struggles of the shift, "If maybe we went to in-person classes, we would have been more okay to ask questions or even ask your friends, not just the professor, ask your friends, get to have a feel of the room." With classes taking place over Zoom, more times than not cameras are off which makes it "hard to know if other people don't understand [the concept] as well." For many of the participants, the lack of interaction led them to feeling isolated within their program.

Many participants revealed a lack of or difficulty with communication. Lois experienced a loss of communication with her mentor and thesis committee, which resulted in her delaying her graduation. She said, "Even when we were communicating, it's like, we weren't really communicating because we'd be having the same

conversations every single week." Likewise, Bebe discussed how tedious communicating with her advisor can be. She communicates via Zoom and email with her advisor and has only seen them once during the semester. She noted, "It makes it hard because they're not as available and if you have a question, no matter how simple, you have to wait for a response." Consistent communication was an issue for almost all the participants.

Feelings of Isolation

Participants discussed challenges affiliated with feeling socially, physically, and academically isolated. For example, Etornam stated:

Yeah, I really do find it hard trying to connect with them [her peers]. I mean, I need to blend in because this is my first time being in class with people who are in class. So yeah, it's difficult. Since we are even having the classes remote, it's worse. At least if it were in person, we will say hi a couple of times and then it gets better. Since it's remote, you're just there by yourself.

Lack of interactions for Etornam has brought on feelings of isolation and loneliness, especially as a first year, international graduate student. She revealed how hard it has been having online courses. Not being able to ask professors questions after their lecture means that she feels alone in learning and understanding concepts. Other participants shared that before the pandemic, they struggled with feeling alone while learning and within their program. These feelings have been exacerbated since the emergence of the COVID-19 pandemic.

National Racial Unrest

Unfortunately, the participants did not reveal a lot of information regarding this topic. However, Lois shared that before George Floyd, an unarmed Black man who was murdered by a white Minnesota police officer Derek Chauvin, similar incidents would not be addressed or acknowledged. She would go "to lab and it's like, everything is business as usual, you know, there's no check-in like nobody says anything." After George Floyd "people wanted to make statements", yet "still the right people were not checking in." Although her program director sent her a direct email to let her know they are there for her and let them know if she needs anything which she was grateful for, but she called the messages "empty":

> I get your intentions, but it's like, these are very empty, like messages because it's like now the onus is on me to decide what I need in terms of support. And then the onus is also on me to go to you and ask you for these things. And it's like I shouldn't have to…I shouldn't have to do all that work.

While national racial unrest impacted people in the U.S., it also had impacted people internationally. Etornam was worrisome and skeptical about coming to the U.S from Ghana for her education:

> Then again with all the Black Lives Matter Movement going on and the shootings and the police brutality and all that, I became a bit skeptical about coming to the US because I'm like, "It could be me. I don't know what will happen if I find myself somewhere and then because of my color, somebody targets me."

Reoccurring Themes

Community and Support

Every woman involved in the study put a lot of emphasis on the importance of community and support. Many found community with friends and outside their programs. Lois said, "My community has literally been my main source of support because throughout all of these different scenarios and situations and setbacks, like they've literally been the only constant form of support. And it's unfortunate." The other women found community and support outside of their programs as well. Victoria had mentors outside of her college; she considered older friends, who identify as Black women, to be mentors. Both Lois and Victoria sought out community outside their programs and found support from surrounding Black communities. When Lois was lacking the necessary support from her program, she "took to social media and I've connected with so many different Black women that are in STEM who were completing their PhDs or completed their PhDs."

When looking for community, these women were not purposefully looking outside their programs; their programs did not have the adequate community the women needed for support. Many of the women mentioned having little interaction with their cohort members even before the pandemic so there was no community established where they felt like they belonged and were at ease.

Looking in a Mirror

Participants discussed the importance of representation and being connected to mentors, classmates, faculty, and other people with similar cultural, gender and racial backgrounds. Even though all participants identify as Black women four of the

participants in the study identify as international students, too. Intersectionality as a theoretical framework permits the entire participants' identities to be recognized. Though they share the same race, intersectionality acknowledges the possible differences in experiences because of their different cultures and nationalities. Amagee was fortunate enough to have people who identified with her culture or have similar cultures to hers:

> Sometimes our curriculum is so the same, so sometimes maybe something that a professor is teaching you, he knows how we were taught maybe in Africa. He can just come here and be like, "Oh, you can go to me." He can explain it in ways that you would understand. Oh, we have hangouts. Oh my goodness. It's really nice having people from my culture in there. I can't overemphasize how glad I am to have people of my race from Africa in my department.

Having that community really enriched her experience in her program. Having people that came from the same culture and similar backgrounds was vital. Amaka said, "If there were more Black women in the department, I would have a better experience, a richer experience. I'd definitely have a lot more friends to talk with." Amaka had a very enriching experience because she had people who she identified with. It was not just about race and gender, but rather race, gender, *and* culture. From an intersectional standpoint, Amaka's identity is not just made up of her race and gender; it is more complex than that. Having people who students can identify with is of the utmost importance.

 According to the women who participated in this study, it was helpful and comforting to know that they were not alone. These women were not just looking for

Black women as their peers but as faculty, too. Amaka had the benefit of having a Black woman as her mentor at one point:

> I really enjoyed the experience because she could relate to a lot of things I was going through, because a few years back she was actually in my shoes. So, it was a very rich experience for me, she was ready to listen to me, and I was more open to discuss things, difficulties I was going through with my courses. I was more open to discuss those things with her.

According to the participants, it is imperative to have other Black people whether it be peers, faculty, or both. Amaka revealed that "there are people who feel like 'Oh, because I know two Black women in this department, I want to be there,' right? Well, I do that sometimes when I look at a particular program like 'Oh, there is no Black person, I'm never going to apply'." Having more diversity within STEM programs not only attracts students from various backgrounds and cultures but it also aids in establishing a more inclusive community and better support for students and faculty.

Participants' Advice and Suggestions

Regarding Community, Support, Diversity and Inclusion

Community and support are imperative to the success and experiences of these women. Many of them did not automatically receive these and had to seek it out. Within their programs, some felt there was no understanding for them, their backgrounds, and their experiences. Many of the participants were either the only Black person in their program or one of a few. Most had no other Black women in their program and of the international students, a couple had peers who shared similar cultures to them. The women's intersecting identities affect their experiences. When there is a lack of

familiarity or similarity among peers and faculty this can lead to them feeling isolated and misunderstood. Universities and STEM programs need to understand the academic background and intersecting identities of their students, especially. Lois said:

> There's no understanding that this person is from an HBCU, a small HBCU at that. And, you know, they may not necessarily have the same type of scientific background as this person, but, yet, we are putting these two people in the same class and telling them, 'go get a B minus or higher, figure it out.

> Once the educational background of the student is understood, a better system

of support and resources can be provided. In the words of Victoria, creating community means to "create safe spaces for Black women and people of color in general." For the sense of community to be strengthened, there needs to be more interactions. Amaka suggested "to have better interaction with other students." It is imperative that universities consider the intersection of race and gender when creating safe spaces and a sense of community in order for Black women to feel more seen and heard within their programs. She stated, I "strongly believes no one should be doing a master's degree alone or with their advisors alone. Sometimes I feel like just a word from the right person each day could just save you from a bad experiment."

Bebe suggested to "recruit diverse faculty to make STEM more appealing." Having more diverse staff and faculty can make it more appealing and inspiring for students from marginalized groups. To quote Bebe, "It's nice to see someone like me." In a journal article, Schwartz (2003) stated that "the lack of African American faculty leaves a void in the support of African American graduate students." Having faculty that

share the same race/culture as the student allows for the possibility of the student to receive better support and understanding.

Etornam suggested more general advice for STEM as a whole. She said "we need more women-friendly policies, so it would maybe be attractive for women" in general. Having policies that protect and support everyone no matter their race, gender, or any other aspect of their identity, is imperative to attracting and retaining students from marginalized groups. Finally, Amagee said, "I wish they would increase our stipend." She was not the only one to mention their stipend, or lack thereof. Lois divulged that when struggling with her grades in her program she sought tutoring. She went to her program for assistance, and they told her that she made enough to pay for her own tutor. Lois said at the time she was making "crumbs" and did not have the resources to pay out of pocket for tutoring. She eventually received tutoring from somewhere else outside of her program but within her college. All these women are very hard working and have many duties. Many are simultaneously teaching assistants, lab researchers, involved in organizations and students. Yet, they barely make livable wages.

Limitations of Research and Future work

There were a few limitations to this research. The first being a small sample size. The goal was to get 6-10 participants. With such a small sample size, I cannot make any broad generalizations. However, this research can easily be built upon in the future. The sample size can be increased to include more diversity among participants' backgrounds and to be able to make more broad generalizations. The second limitation was the time limit. This entire project was done in a single semester. This meant getting

IRB approval, applying for grants, conducting interviews, and writing the report on the research. There was a limited amount of time to complete in-depth interviews and analyses. Again, this can be solved by allotting more time for the research. Finally, only one person conducted the interviews and interpreted the findings. This means that results have been interpreted based on one perspective. There was no one else looking over the findings and offering their own thoughts and interpretations.

There is a plethora of future directions for research on Black women graduate students. This specific project can be broadened regarding the sample size and the background of the participants. Additionally, a more in-depth inspection of the data and findings can be beneficial. When analyzing the transcripts, I noticed that an interesting direction can be taken from the results of this research. While all participants identified as Black women, they are different nationalities and come from different cultures. Questions that came up were: Do they share the same experiences? Do they perceive themselves similarly? Guided by the framework of intersectionality, it would be interesting to explore how their different backgrounds (culturally, socially, academically etc.) affect their experiences as students in STEM programs.

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